REMARKS

I. Introduction

In response to the Office Action dated March 30, 2006, no claims have been cancelled, amended or added. Claims 1-26 remain in the application. Re-examination and re-consideration of the application is requested.

II. Prior Art Rejections

A. The Office Action Rejections

On page (2) of the Office Action, claims 1-13, 15-22, 25 and 26 were rejected under 35 U.S.C. §103(a) as being unpatentable over Du, U.S. Patent No. 5,640,384 (Du), in view of Vaid et al., U.S. Patent No. 6,502,131 (Vaid), and further in view of Ater et al., U.S. Patent No. 6,687,224 (Ater). On page (6) of the Office Action, claims 14, 23 and 24 were rejected under 35 U.S.C. §103(a) as being unpatentable over Du in view of Vaid, further in view of Ater, and further in view of Ort, U.S. Patent 5,784,527 (Ort).

Applicant's attorney respectfully traverses these rejections.

B. The Applicant's Independent Claims

Applicant's independent claim 1 is directed to a method of optimizing data streaming in a peer-to-peer architecture including a plurality of clients in a chain, the method comprising:

each client monitoring its own bandwidth;

each client informing a succeeding client in the chain of that bandwidth;

each client comparing its own bandwidth with the bandwidth of a preceding client in the chain; and

each client, in response to a difference between the compared bandwidths, reordering its position among the clients in the chain.

Applicant's independent claim 16 is directed to a peer-to-peer data streaming system comprising a plurality of clients in a chain, each client including bandwidth-monitoring means for monitoring its own bandwidth, communication means for informing a succeeding client in the chain of that bandwidth, comparison means for comparing its own bandwidth with the bandwidth of a preceding client in the chain, and reconfiguration means responsive to a difference between the compared bandwidths to reorder its position among the clients in the chain.

Applicant's independent claim 25 is directed to a client terminal for use in a peer-to-peer data streaming system having a plurality of client terminals in a chain, the client terminal being configured or programmed to include bandwidth-monitoring means for monitoring its own bandwidth, communication means for informing a succeeding client terminal in the chain of that bandwidth, comparison means for comparing its own bandwidth with the bandwidth of a preceding client terminal in the chain, and reconfiguration means responsive to a difference between compared bandwidths to reorder its position among the client terminals in the chain.

Applicant's independent claim 26 is directed to a program storage medium readable by a computer having a memory, the medium tangibly embodying one or more programs of instructions executable by the computer to perform method steps for configuring or programming a client terminal for use in a peer-to-peer data streaming system having a plurality of client terminals in a chain, the method steps comprising the steps of:

configuring or programming the client terminal to monitor its own bandwidth;

configuring or programming the client terminal to inform a succeeding client terminal in the chain of that bandwidth;

configuring or programming the client terminal to compare its own bandwidth with the bandwidth of a preceding client terminal in the chain; and

configuring or programming the client terminal to reorder its position among the client terminals in the chain based upon a difference between compared bandwidths.

C. The Du Reference

Du describes a network comprising transceivers (1..6) linked in a network topology. The positions of the transceivers in the network topology are changed in dependence on the loads on the end-to-end connections (VC1..VC5) between the transceivers in the network. A configuration is chosen to give efficient use of the capacity available in the network. Each time that a new end-to-end connection (VC) within the network is set up the positions of the transceivers (1..6) are changed such that the network remains optimized.

D. The Vaid Reference

Vaid describes a method and system (100) for monitoring or profiling quality of service within one or more information sources in a network of computers. The method includes a step of providing a network of computers, each being coupled to each other to form a local area network.

The network of computers has a firewall server (110) coupled to the network of computers and a distributed traffic management tool coupled to the firewall server. The method also includes implementing traffic monitoring or profiling of incoming and outgoing information from one of the information sources.

E. The Ater Reference

Ater describes a bandwidth sharing method for use on respective interstitial connections between on one side a plurality of users and on the other side a common data-link having a shared packet switching device, the method including performing the steps of: monitoring data-link directed bandwidth from each user; maintaining a current sum of the monitored bandwidth; and whenever the current sum exceeds a predetermined data-link bandwidth threshold, reducing current collective data-link directed bandwidth by for substantially each user, comparing the respective user's data-link directed bandwidth with a predetermined data-link bandwidth threshold for the respective user; using an allocation function, selecting at least one user who is exceeding his predetermined data-link bandwidth threshold, and for a predetermined time interval, cutting the connection between each selected at least one user and the shared switching device, so as to restore a current sum of the monitored bandwidth to be not greater than the predetermined data-link bandwidth threshold.

F. The Applicant's Claims Are Patentable Over The References

Applicant's invention, as recited in independent claims 1, 16, 25 and 26, is patentable over the references, because the claims recite limitations not found in the references.

Nonetheless, the Office Action asserts the following:

> Claims 1-13, 15-22, 25, 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over by US Patent 5,640,384 issued to Du in view of US Patent 6,502,131 issued to Vaid et al. (Vaid) in further view of US Patent 6,687,224 issued to Ater et al. (Ater).
>
> As per claim 1, 16, 25, 26, Du teaches the method comprising (Abstract): each client informing a succeeding client in the chain of that bandwidth (Figs.2a-2c; each transceiver is informed of other transceiver's bandwidth); and each client, in response to a difference between the compared bandwidths, reordering its position among the clients in the chain (Abstract,col.4, lines 9-55).
>
> Du however does not explicitly teach a client monitors its own bandwidth.
>
> Vaid teaches that a client monitors its own bandwidth (col. 3, lines 8-24, Figs. 9-11).

Therefore it would have been obvious to one ordinary skill in the art at the time of the invention to modify the teachings of Du to explicitly teach a client that monitors it's own bandwidth as taught by Vaid in order to measure quality of service in transferring data over the internet (Vaid, col. 2, lines 12-22).

One ordinary skill in the art would have been motivated to combine the teachings of Du and Vaid to provide a method to monitor the flow of information among a network of clients (Vaid, col. 2, lines 56-67).

Du in view of Vaid does not explicitly teach comparing bandwidth between two users and a method of optimizing data streaming in a peer-to-peer architecture including a plurality of clients in a chain.

Ater teaches a method of optimizing data streaming in a peer-to-peer architecture including a plurality of clients in a chain and further teaches that in the peer to peer sharing, the a peer monitors the bandwidth of another peer (Figs. 1-12, Abstract, col. 4, lines 10-67).

Therefore it would have been obvious to one ordinary skill in the art at the time of the invention to modify the teachings of Du in view of Vaid to instead monitor and compare the bandwidth of the user in a peer to peer architecture as taught by Ater in order to control the bandwidth of users in a peer to peer network (Ater, col. 4, lines 50-67).

One ordinary skill in the art would have been motivated to combine the teachings of Du, Vaid and Ater in order to provide a system to control the bandwidth of users in a peer to peer network (Ater, col. 4, lines 50-67).

These portions of the cited references are set forth below:

Du: Abstract

The application describes a network comprising transceivers (1..6) linked in a network topology. The positions of the transceivers in the network topology are changed in dependence on the loads on the end-to-end connections (VC1..VC5) between the transceivers in the network. A configuration is chosen to give efficient use of the capacity available in the network. Each time that a new end-to-end connection (VC) within the network is set up the positions of the transceivers (1..6) are changed such that the network remains optimized.

Du: Figs. 2a-2c

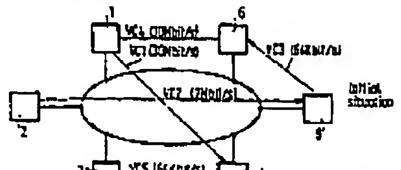

FIG.2a

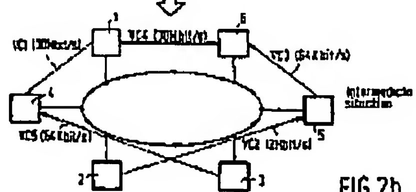

FIG.2b

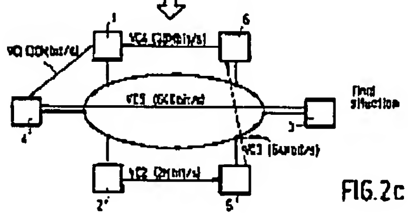

FIG.2c

Du: col. 4, lines 9-55

The radio frequency manager 7 every time that a connection is set up or ended, receives this information via the radio signalling channel from the transceivers. When a new connection is set up the radio frequency manager 7 gets the expected mean load of this connection from the transceiver. Only in these situations the radio frequency manager 7 has to change positions of the transceivers. The radio frequency manager 7 can for example calculate the sum S for every configuration of all the transceivers in the ring. It then chooses the configuration which results in the highest value of S. Especially when the ring has a lot of transceivers and when a lot of virtual channels exist these calculations can take a considerable amount of time. Then a faster optimization procedure could be followed. The radio frequency manager 7 then starts to optimize the network as follows: The transceivers of the virtual channel with the highest mean loads and the lowest frequency utilization factors are placed next to each other. The sum S is calculated for this configuration. When S is larger than in the previous situation, improvement is achieved. Then for the transceivers with the next largest mean load the process is repeated. This will continue until no improvement can be made any more.

This procedure is now further explained: In the initial situation of FIG. 2a the virtual channel with the highest mean load and the lowest frequency utilization factor is VC1. This means that transceivers 1 and 4 should become neighbours. Transceiver 1 is maintained on its position, because VC4 with also a high mean load has a frequency factor of 1, so transceiver 6 and 1 should remain neighbours. So, transceiver 4 is placed next to transceiver 1 while the mutual positions of the other transceivers remain unchanged. This situation is shown in FIG. 2b. The value of S is

improved. Now it has to be determined if further improvement is possible. Therefore transceiver 2 and 5 belonging to VC2 are brought closer together. The result is shown in FIG. 2c. The sum S is further improved. In the configuration of FIG. 2c no further improvement can be reached. Putting the transceivers belonging to VC3 or VC5 close together would have as a result that the frequency factor of VC1 and VC4 is decreased. Since those two virtual channels have a much higher mean load this would lead to a deterioration of the efficiency of the whole network. The sum S would decrease. The fast optimization procedure described here is only one of the possibilities to optimize the network configuration. In case of lack of time to calculate the optimal configuration, also a configuration can be used in which the capacity of the network is used efficiently already, although it is not the best configuration. For example the situation of FIG. 2b is already very satisfactory and could under theses circumstances very well be used.

Vaid: col. 3, lines 8-24

In an alternative specific embodiment, the present invention provides a novel computer network system having a real-time bandwidth profiling tool. The real-time bandwidth profiling tool has a graphical user interface on a monitor or display. The graphical user interface includes at least a first portion and a second portion. The first portion displays a graphical chart representing the flow of information from at least one information source. The second portion displays text information describing the flow of information. The combination of the first portion and the second portion describes the information being profiled. Additionally, the graphical user interface has a portion that outputs a graphical representation including text or illustration of the source itself. The flow of information can be from a variety of sources, such as those described above as well as others, to provide a distributed profiling tool.

Vaid: Figs. 9-11

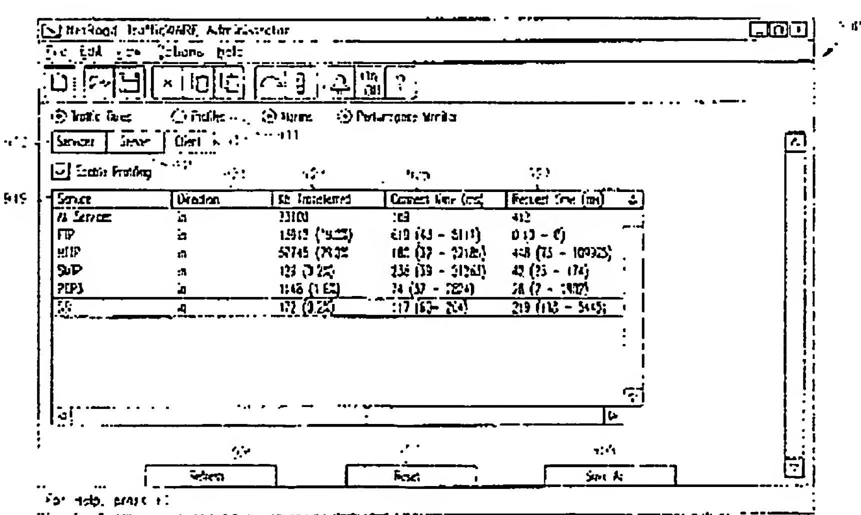

FIG. 9

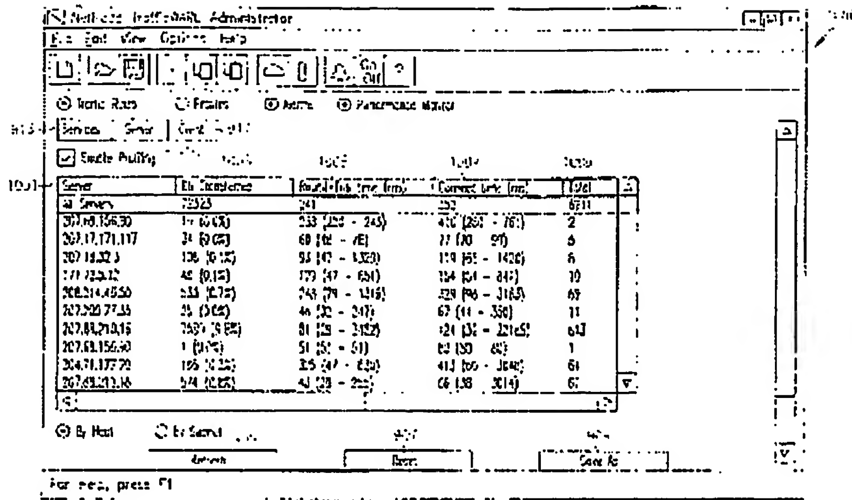

FIG. 10

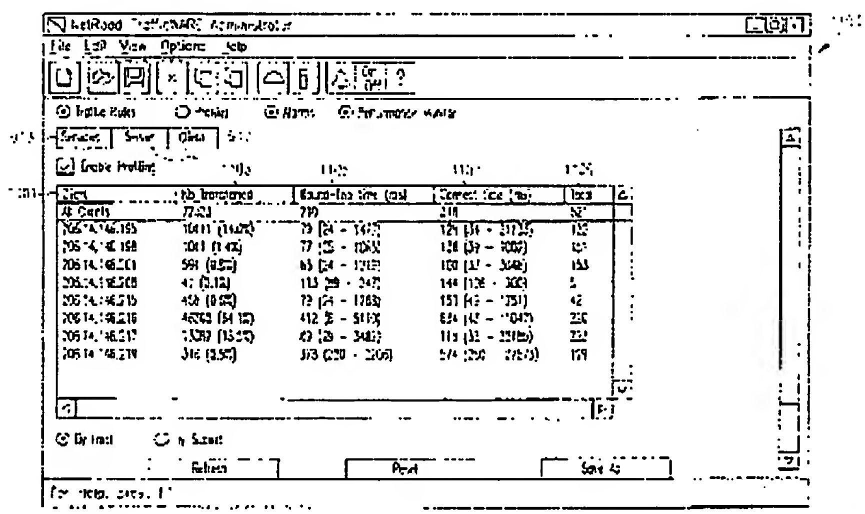

FIG. 11

<u>Vaid: col. 2, lines 12-22</u>

Quality of Service is often measured by responsiveness, including the amount of time spent waiting for images, texts, and other data to be transferred, and by throughput of data across the Internet, and the like. Other aspects may be application specific, for example, jitter, quality of playback, quality of data transferred across the Internet, and the like. Three main sources of data latency include: the lack of bandwidth at the user (or receiving) end, the general congestion of Internet, and the lack of bandwidth at the source (or sending) end.

Vaid: col. 2, lines 56-67 (actually, col. 2, line 56 – col. 3, line 7)

In a specific embodiment, the present invention provides a system with a novel graphical user interface for monitoring a flow of information coupled to a network of computers. The flow of information can come from a variety of location or nodes such as a firewall, a server, a wide area network, a local area network, a client, and other information sources. The user interface is provided on a display. The display has at least a first portion and a second portion, where the first portion displays a graphical chart representing the flow of information, which comes from one of many locations on the network. The second portion displays text information describing aspects of the flow of information. The combination of the first portion and the second portion describes the information being profiled. The display also has prompts in graphical or text form or outputs the source of the flow of information, where the source can be one of a plurality of nodes such as a server, a firewall, a wide area network, a local area network, a client, and other information sources. The present invention can be distributed over a network by way of one or more agents.

Ater: Abstract

A bandwidth sharing method for use on respective interstitial connections between on one side a plurality of users and on the other side a common data-link having a shared packet switching device, the method including performing the steps of: monitoring data-link directed bandwidth from each user; maintaining a current sum of the monitored bandwidth; and whenever the current sum exceeds a predetermined data-link bandwidth threshold, reducing current collective data-link directed bandwidth by for substantially each user, comparing the respective user's data-link directed bandwidth with a predetermined data-link bandwidth threshold for the respective user; using an allocation function, selecting at least one user who is exceeding his predetermined data-link bandwidth threshold, and for a predetermined time interval, cutting the connection between each selected at least one user and the shared switching device, so as to restore a current sum of the monitored bandwidth to be not greater than the predetermined data-link bandwidth threshold.

Ater: col. 4, lines 10-67 (actually, col. 4, line 10 – col. 5, line 7)

DETAILED DESCRIPTION OF THE INVENTION

The present invention relates to a bandwidth sharing method (illustrated in FIG. 1) for use on respective interstitial connections 12 between on one side a plurality of users 34 and on the other side a common data-link 5 (to a data-communications topology 7 using at least one compatible protocol; e.g. the Internet, LAN, WAN, intra-net, etc.) having a shared packet switching device 6. The instant method 10 includes performing the steps of: monitoring 11 data-link directed bandwidth from each user (According to one embodiment the monitoring is of all the bandwidth used by each user, even the bandwidth which is directed to another user via the shared packet switching device; and not intended to use any bandwidth on the common data-link. According to another embodiment the monitoring is only of the data-link directed bandwidth used by each user. Monitoring with a differentiation between destinations requires a much higher degree of data examination and recognition than monitoring of all bandwidth.); maintaining 12 a current sum of the monitored bandwidth; and whenever the current sum exceeds a

predetermined data-link bandwidth threshold, reducing 13 current collective data-link directed bandwidth by for substantially each user, comparing 14 the respective user's data-link directed bandwidth with a predetermined data-link bandwidth threshold for the respective user; using an allocation function, selecting 15 at least one user who is exceeding his predetermined data-link bandwidth threshold, and for a predetermined time interval, cutting 16 the connection between each selected at least one user and the shared switching device, so as to restore a current sum of the monitored bandwidth to be not greater than the predetermined data-link bandwidth threshold. According to the preferred embodiment of the present invention, performing at least one of the steps is done above a predetermined frequency. For example, the step of monitoring is done by sampling each respective user with the common packet switching device every 10 milliseconds, or the step of maintaining is done (updated) every 10 milliseconds, or the step of reducing is done every 5 milliseconds, etc.

According to an embodiment of the present invention, the sub-steps of comparing and selecting are performed substantially with the same frequency as the monitoring step, so that the prerequisites to the sub-step cutting are always available in a updated form. Since all of the steps and sub-steps of the instant method may be performed asynchronously, it is preferred that the legitimacy of performing any cutting be maximized; and that occurrences where the cutting is (after the fact) irrelevant to preventing exceeding common data-link bandwidth allotment are minimized. (Substantially equivalent embodiments of the method of the present invention may be installed directly in an external computer-like device such as 10, or functions accomplished by the steps of the present method may be divided between cooperating front ends of 3 and 4 with back ends of 6 and 7, or a combination of external computer-like device with front ends or with back ends, or the total combination of all.)

Applicant's attorney disagrees with the analysis of the Office Action that the above portions of Du, Vaid and Ater teach or suggest all the limitations of Applicant's independent claims.

Du merely describes how a centralized device, the radio frequency manager, configures the positions of the transceivers, every time that a connection is set up or ended. In Du, when a new connection is set up the radio frequency manager gets the expected mean load of this connection from the transceiver and then may change the positions of the transceivers.

Vaid merely describes a real-time bandwidth profiling tool for a computer. The real-time bandwidth profiling tool of Vaid has a graphical user interface for monitoring the flow of information coupled to a network of computers.

Ater merely describes an algorithm for Bandwidth Control (BC) that is used in conjunction with a single switch buffer, wherein the switch buffer has multiple ports attached to the users for the flow of data into the switch and an up-link for the flow of data out of the switch. The general purpose of the Bandwidth Control algorithm is for limiting bandwidth (BW) usage, or conversely

guaranteeing a minimum bandwidth . The specific purpose of the Bandwidth Control algorithm is to be able to guarantee a minimal bandwidth to customers who will purchase such an advantage, and to equally distribute the momentarily unused bandwidth to all users.

However, the combination of Du, Vaid and Ater does not teach or suggest each client monitoring its own bandwidth, each client informing a succeeding client in the chain of that bandwidth, each client comparing its own bandwidth with the bandwidth of a preceding client in the chain, and each client, in response to a difference between the compared bandwidths, reordering its position among the clients in the chain.

Specifically, the Office Action's assertion that Ater teaches the monitoring and comparing the bandwidth of the user in a peer to peer architecture in order to control the bandwidth of users in a peer to peer network is incorrect.

Instead, only the Bandwidth Control device of Ater monitors the bandwidth of each user – not each client itself. In addition, only the Bandwidth Control device of Ater is informed of each user's bandwidth – none of the users inform a succeeding client in the chain of its bandwidth (indeed, there are no "succeeding" users or a "chain" of users). Moreover, it is only the Bandwidth Control device of Ater that compares the bandwidths of the various users -- not each client itself. Finally, none of the users in Ater have their "position" reordered; instead, the Bandwidth Control device of Ater reduces the bandwidth of the user or cuts the connection of the user.

Consequently, the combination of Du, Vaid and Ater does not teach or suggest the limitations of Applicant's independent claims.

Ort fails to overcome the deficiencies of the combination of Du, Vaid and Ater. Recall that Ort was cited only against dependent claims 14, 23 and 24, and merely for teaching the handling of errors encountered in an MPEG audio/video data stream during playback.

Thus, Applicant's attorney submits that independent claims 1, 16, 25 and 26 are allowable over Du, Vaid, Ater and Ort. Further, dependent claims 2-15 and 17-24 are submitted to be allowable over Du, Vaid, Ater and Ort in the same manner, because they are dependent on independent claims 1, 16, 25 and 26, respectively, and thus contain all the limitations of the independent claims. In addition, dependent claims 2-15 and 17-24 recite additional novel elements not shown by Du, Vaid, Ater and Ort.

III. Conclusion

In view of the above, it is submitted that this application is now in good order for allowance and such allowance is respectfully solicited.

Should the Examiner believe minor matters still remain that can be resolved in a telephone interview, the Examiner is urged to call Applicant's undersigned attorney.

Respectfully submitted,

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